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ABSTRACT

As part of a larger study on the levels experienced by deaf children in acquiring knowledge about printed letters, words, and stories, an investigation was undertaken to discover the effects of a reciprocal teaching method on deaf children's learning of four prereading skills--finger spelling, book reading, story reciting, and word recognition. Subjects, 23 prelingually deaf kindergarten and first grade students with severe-to-profound and profound hearing losses, met in groups of five or six for 30 minutes each week with the teacher. The teacher read and signed an experimental storybook containing three to five new words in a picture context with a manual sign illustration. After discussing the new signs, the children performed a number of activities involving the four target skills. In addition, the children took the books home to read with siblings, parents, and friends. Gains made in prereading were measured through pretesting and posttesting. Results indicated that the reciprocal teaching procedure could build prereading skills in young deaf children. The training was beneficial for students with a wide range of abilities. (FL)

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CENTER FOR THE STUDY OF READING

Technical Report No. 350

DEAF CHILDREN'S ACQUISITION OF PREREADING SKILLS USING THE RECIPROCAL TEACHING PROCEDURE

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The production of this paper was supported in part by the National Institute of Education under Contract No. 400-81-0030. It does not, however, necessarily reflect the views of this agency. Jean F. Andrews is an assistant professor in the Department of Special Education at Eastern Kentucky University, Richmond, Kentucky, 40475. Portions of this paper were presented at Council of American Instructors of the Deaf, Florida School for the Deaf, St. Augustine, Florida, June 22, 1985.

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Abstract

Information about implementing a prereading program using the reciprocal training procedure in a school setting and on implications for educators, teacher educators and parents is presented. This instructional procedure grounded in Vygotsky's theory of language and learning is an interactive dialogue through which the teacher explicitly models four prereading skills: finger spelling, book reading, story reciting and word recognition during story-time session with experimental story books. Twenty-three prelingually deaf kindergarteners and first graders ranging in ages from five to eight with severe-to-profound and profound hearing losses participated in this study. Four groups of five to six students met for 30 minutes each week over the nine month school year (12.5 clock hours of training). Lesson transcripts and pre-post test analyses show that gains were made in letter, word and story knowledge using the reciprocal teaching procedure.

Deaf Children's Acquisition of Prereading Skills Using the Reciprocal Teaching Procedure

Longitudinal research with preschool hearing children has shown that children need to learn concepts about letters, about words and about stories before they can successfully learn to read (Mason, 1980; Soderbergh, 1977; Bissex, 1980). According to Mason (1980), children may acquire these early concepts informally by pointing out print in their environment, by having their parents read stories to them and by printing letters and words in their drawings. These early concepts or prereading skills are believed to lay the foundation of early literacy.

How do deaf children acquire these prereading skills? By observing children in the classroom over a nine month time frame and interviewing their parents, deaf children were found to acquire these early reading concepts by using fingerspelling and manual signs in a systematic fashion. A full description of the levels deaf children go through in acquiring knowledge about printed letters, words and stories is found in Andrews, 1983. This paper describes one aspect of this study--the effects of teaching four prereading skills: fingerspelling, book reading, story reciting and word recognition on deaf children's prereading abilities. The skills were taught using a procedure referred to as reciprocal teaching in which students received explicit instruction, modeling and corrective feedback regarding the four prereading skills. The data reported here is more formally

described in other manuscripts (Andrews, 1983; Andrews & Mason, 1986). Here, information about implementing a prereading program in a classroom setting and on implications for teachers is described.

The Selection of Prereading Skills

Four prereading skills were selected for this training. This set of print oriented tasks were considered important for beginning reading (Mason, 1980; McCormick & Mason, 1981). The focus here was to give the deaf children extensive practice fingerspelling letters and words, holding and reading books and recognizing words and reciting simple stories using sign language. These skills were modelled by the teacher in the story-time sessions with the children guided in practicing these skills.

The four prereading skills are fingerspelling, book reading, story reciting and word recognition. The first skill was fingerspelling. Initially we included naming letters with fingerspelling as well as fingerspelling people's names and short three-letter words. Most deaf children by age five can fingerspell the alphabet so we only included name and word fingerspelling in our data analysis. The skill of spelling has received support as an early prereading skill by Mason (1980), Soderbergh (1977) and Bissex (1980). Similarly, Hoemann (1972, 1974) and Hirsh-Pasek (1981) reported that deaf children's fingerspelling abilities are closely tied to their reading

vocabularies. The second skill was book reading. The ability to hold a book, turn pages and attend to pictures and words were found to be early reading concepts (Clay, 1979). A third skill was story reciting because knowledge of story concepts (Mandler & Johnson, 1977; Cochran-Smith, 1983) was considered to be a precursor skill to reading comprehension. Finally, a word recognition task was included as a large accessible sight word vocabulary was considered necessary for the beginning reader (Gibson & Levin, 1975). It is important to note that the skills taught and evaluated in this research are prereading skills which are different than reading skills. While reading skills are concerned with decoding and comprehending sentences in longer texts, prereading skills deal with knowledge of early concepts about printed letters, words and stories.

The Reciprocal Teaching Procedure

The instructional technique used to teach the four prereading skills is much like interactive mother-child, teacher-student dyads. Called reciprocal teaching, this procedure consisted of an interactive dialogue where the teacher explicitly models the four skills. The children imitate the teacher's example by performing the same skills at whatever level they are on and the teacher then prompts and shapes the children's participation through corrective feedback (Palincsar, 1983).

Theoretical framework. The reciprocal teaching procedure is grounded in Vygotsky's learning theory (1978). In reference to

this study, according to Vygotsky, the teacher's primary function is to lead the child from his present level of prereading development to more advanced stages of reading development through modeling and corrective feedback. This learning is said to occur within the child's "zone of proximal development," which Vygotsky says is the distance between the child's actual development and the level of his potential development achievable with adult guidance.

Support for the reciprocal teaching procedure is found in several reading comprehension studies (Palincsar, 1983, 1984; Brown, Palincsar, & Armbruster, 1984). In these studies, students increased their comprehension ability after receiving explicit instruction, modeling and corrective feedback on the four comprehension monitoring/fostering activities. This demonstration, similarly, uses this same instructional procedure but with prereading skills instead of comprehension skills.

The intervention took place for 30 minutes once a week for 25 weeks over a full school year. These general procedures occurred each week.

1. The teacher read and signed an experimental storybook to five children seated in a semi-circle around her using signs and speech. Each storybook contained from three to five new printed words in a picture context with a manual sign illustration. Each book contained about seven to eight pages of pictures and words.

2. The teacher discussed the three new signs with the students to see if they could use these signs in their communication.

3. Following this discussion, each child received a copy of the storybook. The children held and read the book to themselves and to their peers with the assistance of the teacher. The sign-to-print correspondence was made explicit in the storybooks.

4. The children playacted the stories using the storybooks as a script. One child held up the book to prompt the sequencing of actions for the actors. Remaining children acted as a signing chorus and signed along the story.

5. The children returned to their seats in the semicircle. One child recited the story without the aid of the storybook while his/her peers provided prompting if necessary.

6. With the aid of the storybook, children practiced fingerspelling the words, printing them on the blackboard and reading and reciting the stories to each other.

7. The teacher provided praise and feedback specific to the child's level of participation. Following this feedback, the teacher modelled any activity the child needed improvement on.

8. The children brought the books home to read with siblings, parents and friends. A total of 20 books were used over the school year.

Evaluating Reciprocal Teaching of Prereading Skills

A description of the students, training materials, intervention procedures, research questions and measures follow.

Students. Twenty-three prelingually deaf kindergarteners and first graders with severe-to-profound and profound hearing losses participated in the reciprocal teaching training. All children attended a state residential school. They were between five and eight years of age, had a sensorineural hearing loss between 71dB and 115 dB (Ansi, 1969) in the better ear across the speech range, had lost their hearing before age two, had normal intelligence and had no additional handicaps. A control group of 22 prelingually deaf children with similar background characteristics from two other residential schools were tested for purposes of comparison. These children had a wide range of communication abilities. The children used speech, manual signs and fingerspelling for communication with about six children knowing less than 50 signs and about four children knowing several thousands of signs and ASL constructions.

Procedures and design. To measure the gains made over the school year in the prereading training, a pretest was given in September and a posttest in May. This test consisted of eight prereading tasks measuring knowledge in letters, fingerspelling, book reading, story reciting and word recognition. Univariate t-test (adjusted for pretest scores) were performed on the posttest scores in order to measure the effects of the training.

Within the experimental group who received the training (N = 23), four groups of five to six students met for 30 minutes each week over the nine-month time frame (a total of 12.5 clock hours of training) for the prereading training. Using the reciprocal teaching procedure, the 23 children were coached on fingerspelling, book reading, story reciting and word recognition. Within the training using this procedure, we measured the differential effects of the training with a second classroom experiment. The 150 print words (of the word recognition tasks) (Griswold & Commings, 1974) were ranked in difficulty based on the pretest results and put into three equivalent groups of 50 words each. Fifty drilled words appeared in the training books and were rigorously taught. Fifty exposed only words appeared in the training materials but were not actively taught. Fifty untaught words were not presented in the training sessions and did not appear in the materials. A comparison of words learned within each word set allowed us to determine to what extent exposure to printed words would be helped by drill (see Figure 1). Two planned orthogonal comparisons were carried out on the experimental group's word learning data in order to determine if amount of exposure influenced word learning across three levels of treatment: words drilled, words exposed and new words.

Insert Figure 1 about here.

Materials. The training materials consisted of 20 experimenter-made simple storybooks and 50 drill cards. Each storybook was constructed on 5" by 8" cardboard approximately seven to eight pages in length (adapted from Mason, 1980). Each story featured pictures, a simple story plot, single words and phrases (vocabulary was taken from a list of expressive vocabulary of deaf preschool children, Griswold & Commings, 1974). With each printed word was a graphic illustration of the ASL lexical sign equivalent (Bornstein, Hamilton, Kannapell, Roy, & Saulner, 1975, see Figure 2). The drill cards had the printed word on one side with the ASL lexical sign on the reverse side.

Insert Figure 2 about here.

Intervention. As explained above, the reciprocal teaching procedure is an interactive dialogue through which the teacher explicitly models the four prereading skills. The children model the teacher's example with the teacher following up by prompting and shaping the students' participation through corrective feedback. The specific steps are:

MODELING	DISCUSSION	GUIDED READING	SUPERVISED PRACTICE
of story reading	of 3 to 5 target signs	with target signs read with printed words in story context	Children holding and reading books, play-acting and reciting stories, fingerspelling words, reading words

Table 1 is a transcript of one storytime session. This transcript illustrates each of the steps of modelling, discussion, guided reading and supervised practice of the reciprocal teaching procedure (see Table 1).

Insert Table 1 about here.

Results

Four research questions were asked in this study. Each question with its corresponding dependent measure is reported here. A more detailed description of the measures and results can be found in Andrews (1983).

Please refer to Tables 2 and 3 and Figures 1 and 3 as each of the research questions are addressed. Did the students improve in their fingerspelling abilities during this intervention? On the fingerspelling task, the children were asked to fingerspell their name and five three to four letter words. Over the nine months of training, the experimental group practiced fingerspelling the target vocabulary (100 words). A t-test indicated on the fingerspelling task that the experimental

group outperformed control group $t(1,44) = 4.88$, $p < .001$. See Figure 3 and Tables 2 and 3.

The second question posed was: did the students' ability to attend to books increase as a result of the reciprocal teaching procedure? On this book reading task, children were asked to hold a book upright, sequence pages and attend to words on the page. After nine months of training holding books, sequencing pages and reading words in story books, a t-test indicated the training group outperformed the control group, $t(1,44) = 4.55$, $p < .001$.

The third question was: did the reciprocal teaching procedure increase the children's ability to recite content items from a story? This measure required the children to read a 10-15 content item story then recite back the story without the aid of the book. The t-test showed that the experimental group outperformed the control group, $t(1,44) = 2.22$, $p < .05$. See Figure 3 for gains and Tables 2 and 3.

The last question was: did the reciprocal teaching procedure increase the children's ability to label print words with ASL lexical sign equivalents? Here, the children were asked to identify 150 sight words with the ASL sign equivalent on this measure. During the training, the children read the words in the context of stories. Again, results showed on the May posttest, that the experimental group outperformed the control group on the word recognition task, $t(1,44) = 4.58$, $p < .001$ (see Tables 2 and

3 and Figure 3). Another data analysis was performed on this task. Two orthogonal comparisons support the differences between exposed and untaught words ($t, 44 = -6.84, p < .05$). Thus, exposure plus word drill had a significant advantage. See Figure 1.

Insert Figure 3 and Tables 2 and 3 about here.

Discussion and Recommendations for Implementing the Reciprocal Teaching

The results indicate that the reciprocal teaching procedure can build prereading skills in young deaf children. With as little as 30 minutes per week, working with children in small groups, children's prereading skills can be improved. The study had children with a wide range of entering prereading behaviors. Some children could only identify a few letters, while more skilled children could read sentences in storybooks. Yet, the training was beneficial for students within this wide range of abilities as the teacher intervened and modelled prereading behaviors appropriate to the child's current level. For example, most skilled children still needed practice in reciting stories (story concepts) while least skilled children need practice labelling pictures with signs. The reciprocal teaching procedures accommodated both learners. The benefits even extended into the home environment as children took their

storybooks home and read to their friends and parents. Children became sign language teachers to their hearing relatives as they practiced reading and reciting the simple story plots.

To encourage teachers to use the reciprocal teaching procedure, the following guidelines are suggested: (a) by integrating this procedure into the school's reading curriculum with as little as 30 minutes a week in practice, gains in prereading skills will occur, (b) for those students who have difficulty in the story reciting activity (as our training showed some students had difficulty here) modeling and positive corrective feedback with encouragement and praise can be helpful, (c) frequent measures of performance on the story reciting activity are important to ensure the intervention is successful. If a student is reluctant to participate, give this child more opportunities to act out the story with an open book, then move into the story reciting activity. These students typically have had little experience having stories read and told to them. (d) create a network of peer tutors who can prompt their less capable classmates in a relaxed and comfortable manner.

The reciprocal teaching procedure can be taught to teachers-in-training, classroom teachers and parents of deaf children. It requires firstmost that the teacher possess effective communication skills with their deaf students. Sample training materials can be obtained from the author. Other easy-to-read children's books can be used.

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Table 1

Portion of transcript illustration how MODELING of story-reading activity took place

(Five students are seated in chairs in a semi-circle around teacher.)

T: (Holds book on lap and signs story) TITLE[1] EGG ROLL. ONE DAY I SEE A BIG TREE. UNDER THE TREE IS A NEST WITH THREE EGGS. ONE EGG FALLS OUT OF THE NEST. EGG ROLLS DOWN THE HILL. ROLL. ROLL. ROLL. ROLL AROUND TREE. EGG ROLL. ROLL. ROLL. ROLL. EGG HITS ROCK. OUT POPS A BIRD!

T: WHAT HAPPEN?

S: (Signs) BREAK

Portion of transcript illustrating the teacher engaged in a DISCUSSION of the target signs

T: (Shows students a real egg and an apple, points to egg and signs.) WHAT?

S: (Signs) EGG

T: (Points to apple and signs) WHAT?

S: (Signs) APPLE

T: (Rolls the egg toward one student and signs) WHAT ACTION?

S: (Signs) ROLL

Table 1 (Continued)

T: (Rolls the egg to each student and asks each child for the sign ROLL, rolls the apple to each student and asks each child for the sign ROLL.)

T: (Draws a picture of a tree on the blackboard.)

S: (Looks at the picture and signs) TREE

T: (Asks each child to roll him/herself across the rug.)

S: (All sign) ROLL.

Portion of transcript illustrating the process of GUIDED READING

T: (Distributes books and tells children that if they can read the storybook, they may keep it.)

S: (Holds book in lap, reads and signs each page) EGG ROLL, ROLL, ROLL, TREE, ROLL, ROLL.

S: (Another student also holds book in lap and signs to himself) EGG ROLL, EGG ROLL, ROLL, TREE, ROLL, ROLL.

S: (Another student leaves the reading group and goes to the back of the classroom to read and sign to himself.)

T: (Teacher has each student hold the book in lap, read and sign the story to her.)

T: (Asks students to play act the story.)

S: (Play act the story with three participants: The tree, the rock, the egg.)

Table 1 (Continued)

S: (Story is play-acted five times with each student taking a turn being the egg that rolls down the hill.)

T: (With drill cards points to graphic illustration of sign.)

S: (Looks at card and signs) ROLL.

T: (Points to print word, roll)

S: Finger spells R-O-L-L.

T: (Signs) ROLL

S: (Signs) ROLL

Table 2

Percentage Group Means, Standard Deviations for all Deaf Subjects by Treatment on September Subtest (Pre) and May Subtest (Post)

	Experimental Group (N=23)		Control Group (N=22)	
Subtest	Pre $\bar{X}$	Post $\bar{X}$	Pre $\bar{X}$	Post $\bar{X}$
Fingerspelling (N=18)	2.13 (1.52)	10.60 (5.47)	3.36 (3.85)	6.40 (5.87)
Book Reading (N=14)	5.48 (4.78)	12.74 (1.84)	5.14 (5.73)	9.54 (3.79)
Book Recitation (N=23)	2.52 (1.99)	9.48 (6.77)	3.22 (5.38)	6.00 (5.18)
Drilled Words (N=50)	6.74 (8.72)	29.39 (19.46)	7.77 (13.92)	16.23 (16.94)
Exposed Words (N=50)	8.26 (9.55)	24.69 (16.19)	8.64 (13.09)	17.54 (15.35)
New Words (N=50)	6.04 (8.15)	19.48 (15.74)	6.45 (11.25)	15.50 (15.58)

NOTE: The number in the parentheses below the mean is the standard deviation.

Table 3

Univariate T-Test for Effects of Training on May Posttest for all Subjects (N=45)

Posttest	dif.	Standard Error	t-value	t
1. Fingerspelling	1	0.56116	4.8806	0.00002***
2. Book Reading	1	0.4103	4.5518	0.00006***
3. Book Recitation	1	0.8690	2.2219	0.0328*
4. Drilled Words	1	1.5412	4.5833	0.00006***
5. Exposed Words	1	0.9379	4.2991	0.00013***
6. New Words	1	0.7511	3.0683	0.0041**

*p < .05

**p < .01

***p < .001

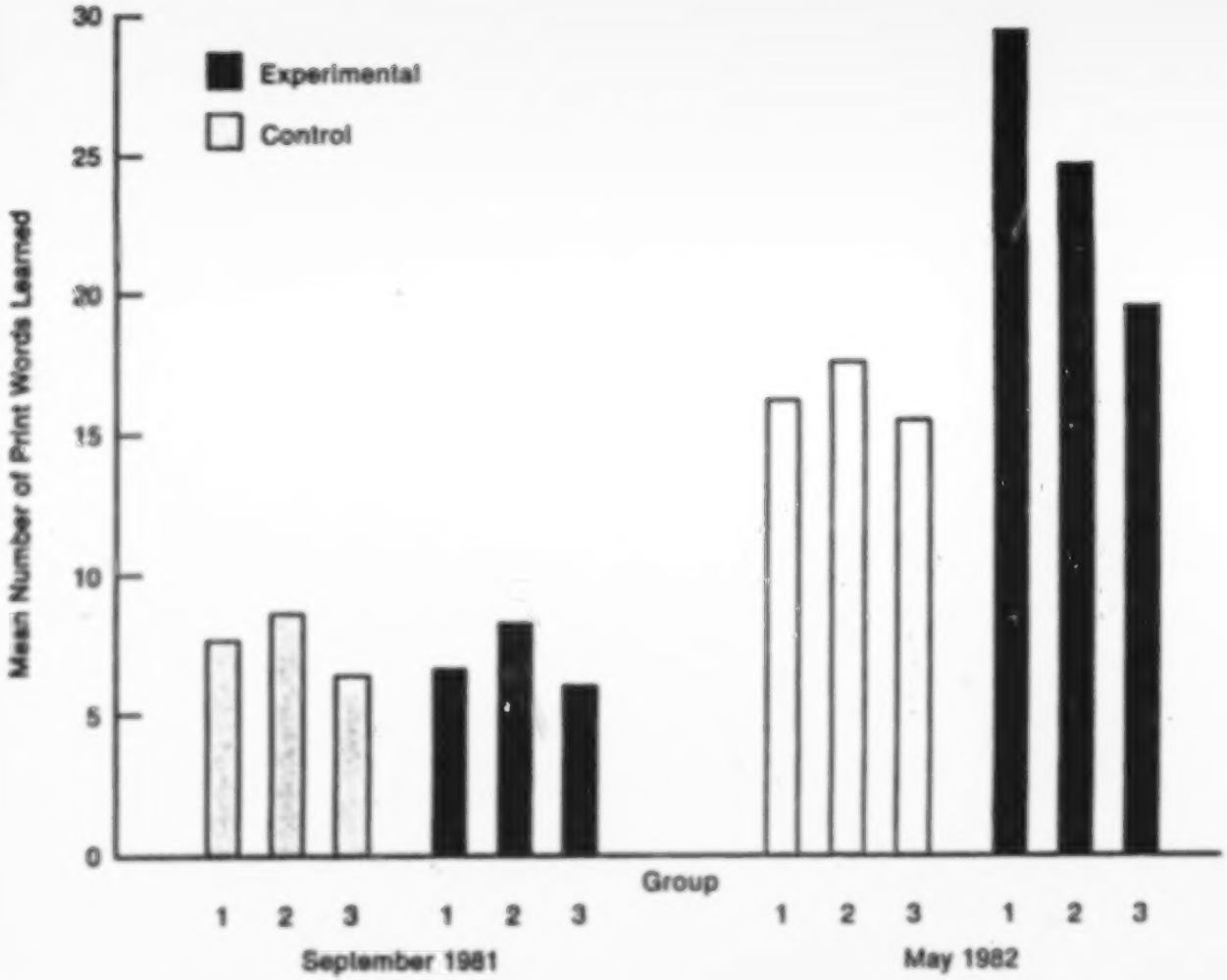
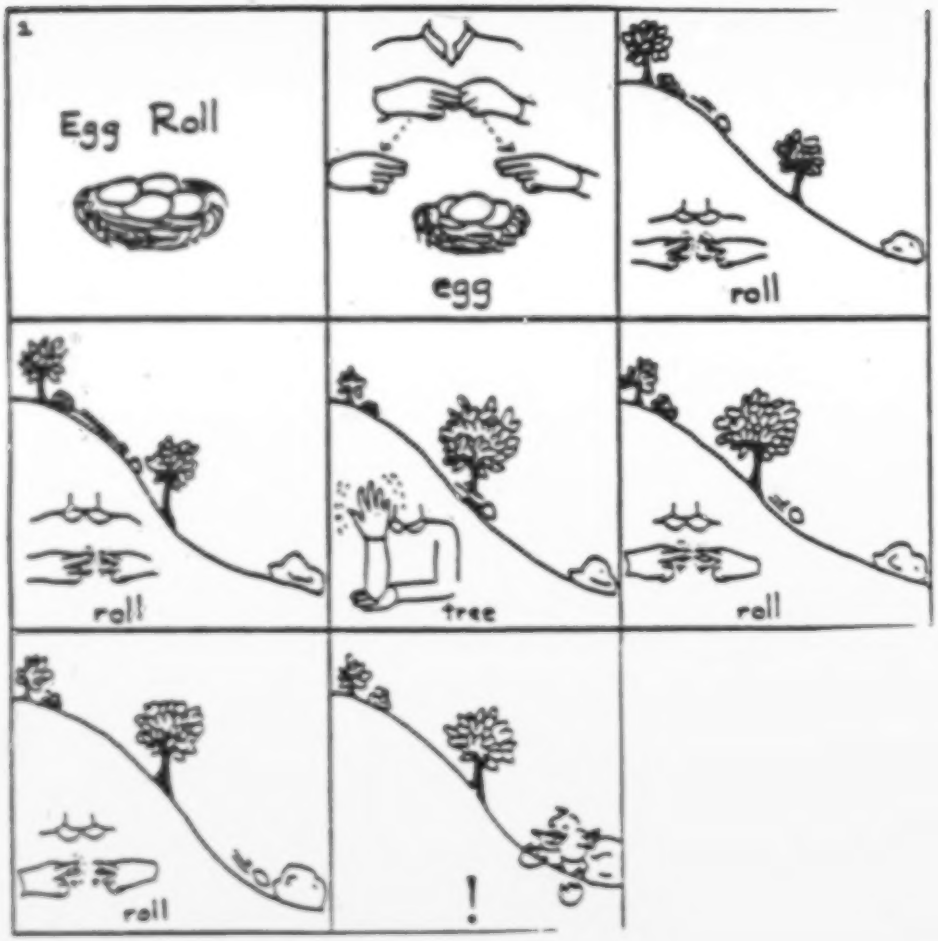


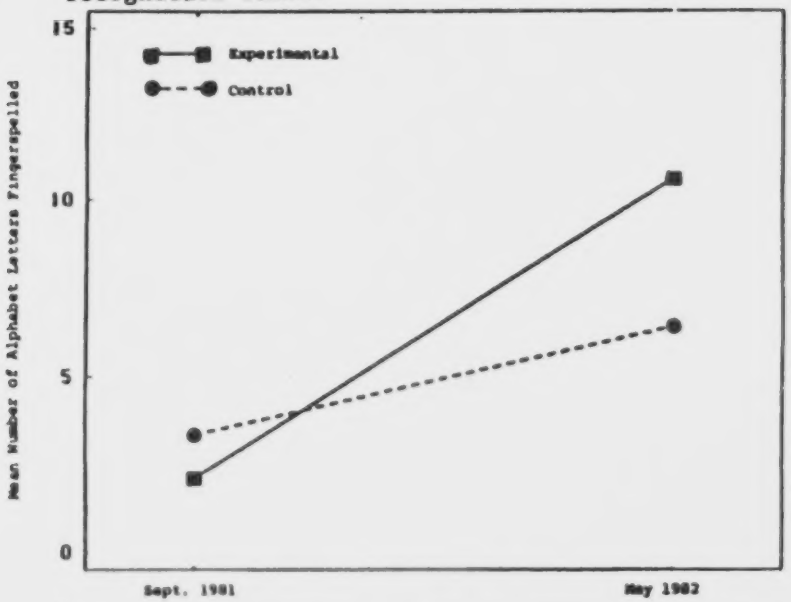
Figure 1: Mean number of print words learned in Group 1 (drilled words), Group 2 (exposed words), and Group 3 (new words) by deaf subject in September (before training) and in May (after training).

Figure 2: One Sample Story[1,2,3]

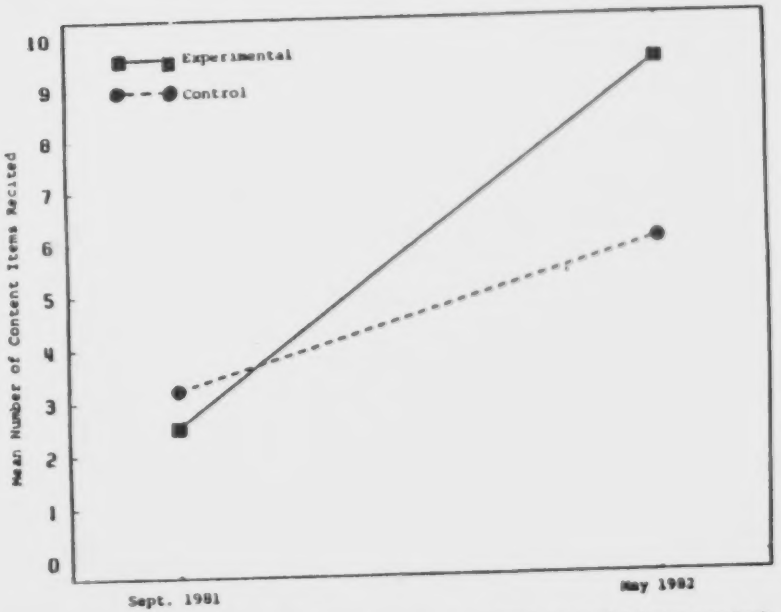


1. Adapted from Mason (1980)
2. Words from Griswold and Commings (1974)
3. Sign illustrations from Bornstein et al. (1975)

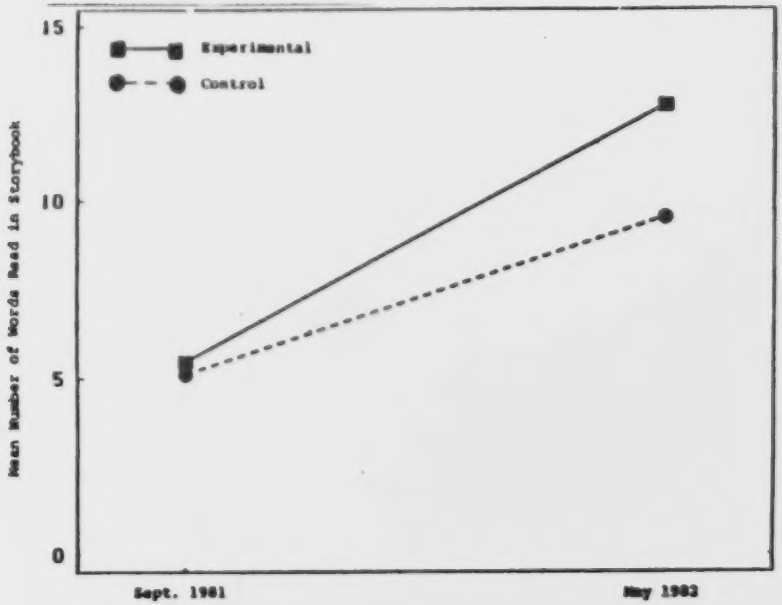
Figure 3: September to May gains on fingerspelling, book reading, story reciting and word recognition tasks.



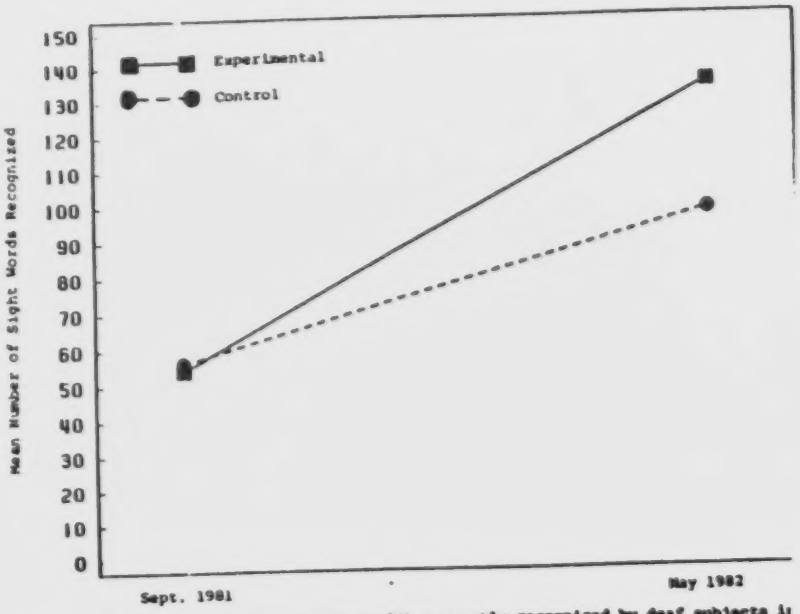
Mean number of letters correctly fingerspelled by deaf subjects on fingerspelling task in September (before training) and in May (after training.



Mean number of content items correctly recited by deaf subjects on book recitation task in September (before training) and May (after training).



Mean number of words correctly read by deaf subjects on book reading task in September (before training) and in May (after training).



Mean number of sight words (n = 150) correctly recognized by deaf subjects in September (before training) and in May (after training).

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